Blancett®
Turbine Flow Meters

Flow Monitor

B2800 Advanced

Badger Meter

DSY-PM-00286-EN-02 (May 2015)

User Manual

CONTENTS

Scope of This Manual . . . 3
Unpacking and Inspection . . . 3
Safety . . . 3
Terminology and Symbols . . . 3
Considerations . . . 3
Introduction . . . 4
Operating the Monitor . . . 5
Buttons . . . 5
Modes . . . 5
Programming . . . 6
Programming Mode . . . 6
Return to Run Mode . . . 9
Run Mode . . . 9
Additonal Scaling Parameters . . . 9
Flow 4 mA Setting . . . 10
Flow 20 mA Setting . . . 10
4…20 mA Calibration . . . 10
4…20 mA Test . . . 10
Battery Replacement . . . 10
Additional Input Options . . . 11
Additional Scaling Information . . . 12
Pulse Output Signals for Linear Processes . . . 12
Pulse Output Signals for Non-linear Processes . . . 13
Default K-factor Values . . . 13
Troubleshooting Guide . . . 14
Part Number Information . . . 14
Specifications . . . 15
Mounting Options and Dimensions . . . 16
Meter Mount . . . 16
Remote Mount . . . 16
Swivel Mount . . . 17
Replacement Parts . . . 18
Installation Drawing . . . 19

SCOPE OF THIS MANUAL

This manual is intended to help you get the B2800 flow monitor up and running quickly.

IMPORTANT

Read this manual carefully before attempting any installation or operation. Keep the manual accessible for future reference.

UNPACKING AND INSPECTION

Upon opening the shipping container, visually inspect the product and applicable accessories for any physical damage such as scratches, loose or broken parts, or any other sign of damage that may have occurred during shipment.

NOTE: If damage is found, request an inspection by the carrier's agent within 48 hours of delivery and file a claim with the carrier. A claim for equipment damage in transit is the sole responsibility of the purchaser.

SAFETY

Terminology and Symbols

DANGER Indicates a hazardous situation, which, if not avoided, is estimated to be capable of causing death or serious personal injury.

WARNING Indicates a hazardous situation, which, if not avoided, could result in severe personal injury or death.

CAUTION Indicates a hazardous situation, which, if not avoided, is estimated to be capable of causing minor or moderate personal injury or damage to property.

Considerations

The installation of the B2800 monitor must comply with all applicable federal, state, and local rules, regulations, and codes.

WARNING

EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2.

AVERTISSMENT

RISQUE D'EXPLOSION - LA SUBSTITUTION DE COMPOSANTS PEUT RENDRE CEMATÉRIEL INACCCEPTABLE POUR LES EMPLACEMENTS DE CLASSE I, DIVISION 2.

WARNING

DO NOT CONNECT OR DISCONNECT EITHER POWER OR OUTPUTS UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSMENT

RISQUE D'EXPLOSION. NE PAS DÉBRANCHER TANT QUE LE CIRCUIT EST SOUSTENSION, À MOINS QU'LL NE S'AGISSE D'UN EMPLACEMENT NON DANGEREUX.

IMPORTANT

Not following instructions properly may impair safety of equipment and/or personnel.

INTRODUCTION

The B2800 flow monitor is a state-of-the-art digital signal processing flow monitor, designed to provide exceptional flexibility at a very affordable price. Though designed for use with Blancett flow meters, this display can be used with almost any flow meter producing a low amplitude AC output or contact closure signal.

This flow monitor is capable of accepting a low level frequency input for calculating flow rate and total. These calculations can then be displayed in the specified units of measurement. All B2800 flow monitors are pre-programmed at the factory, if ordered with a Blancett flow meter. If required, however, the monitor can easily be reconfigured in the field.

The monitor's large 8-digit by 0.75 in. (19.05 mm) numeric liquid crystal display makes extended range viewing practical. The second 8-digit by 0.38 in. (9.65 mm) alphanumeric display provides for selectable units viewing in *RUN* mode and prompts for variables in program mode. You can display rate or total, or alternate between rate and total.

OPERATING THE MONITOR

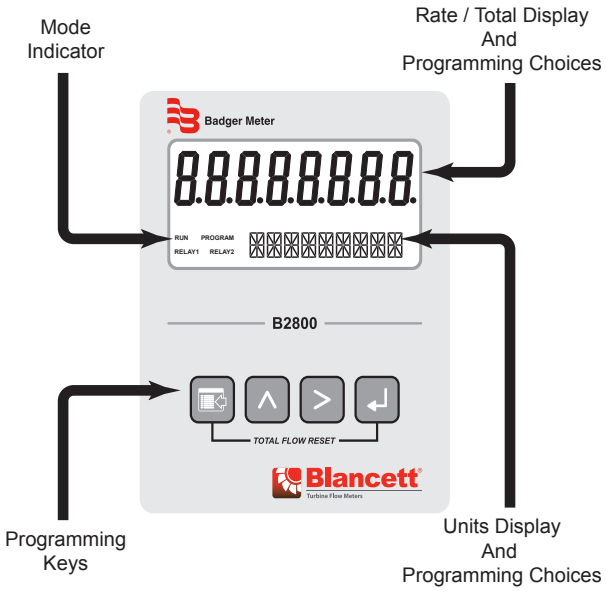


Figure 1: B2800 flow monitor

Buttons

	MENU	Enters and exits *PROGRAM* mode
	UP	Scrolls forward through the parameter options, increments numeric variables and scrolls backward through parameters
	RIGHT	Scrolls backward through the parameter options, moves the active digit to the right and scrolls forward through parameters
	ENTER	Saves programming information, advances to the next programming parameter, and used in the reset process

Modes

RUN	Normal operating mode
PROGRAM	Used to program parameters in the display

If your monitor was ordered with a Blancett flow meter, the two components ship from the factory calibrated as a set. If the monitor is a replacement, the turbine's K-factor has changed or the monitor is being used with some other pulse generating device, the monitor must be programmed.

PROGRAMMING

Each turbine flow meter is shipped with either a K-factor value or frequency data. If frequency data is provided, the data must be converted to a K-factor before programming the monitor. K-factor information, when supplied, can usually be found on the neck of the flow meter or stamped on the flow meter body. The K-factor represents the number of pulses per unit of volume. The K-factor will be needed to program the monitor readout.

Programming Mode

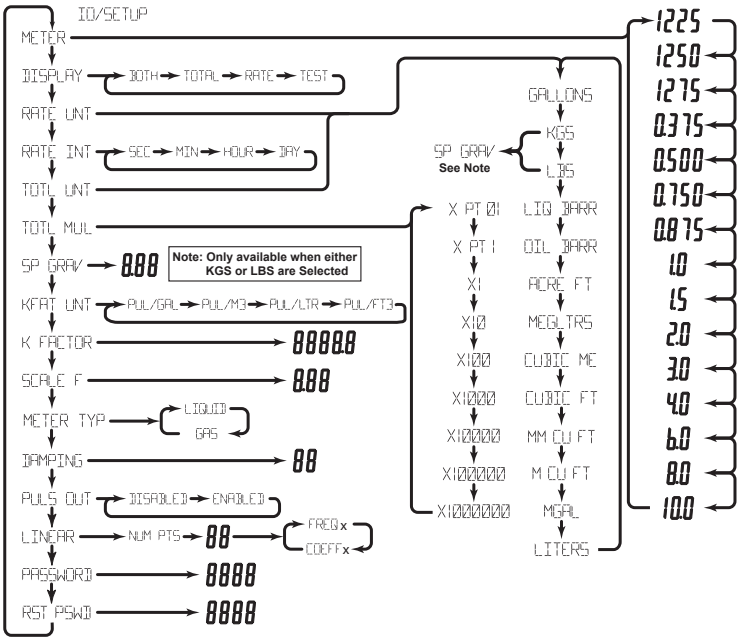


Figure 2: Advanced programming menu

Enter Programming Mode

Press **MENU** to enter the programming mode. The mode indicator changes from *RUN* to *PROGRAM*.

NOTE: If any input value exceeds the meter's capabilities for that particular parameter, the *LIMIT* indicator flashes, indicating an invalid entry. Press **ENTER** to return to the parameter's entry screen to reenter the value.

Select Meter Size

At the *METER* prompt, press **ENTER**. The current meter size flashes. If the current setting is correct, press **ENTER** to advance to the next parameter. To change the current setting, press **UP** or **RIGHT** to scroll to the bore size of your meter. Press **ENTER** to save and advance to the *DISPLAY* parameter.

NOTE: The meter connection size and the bore size are different. For example, many of the one inch NPT turbines have bore sizes that range from 3/8…1 in. (9.53…25.4 mm). Use the correct bore size so the meter will report correct flows and totals.

Select Display Function

The monitor can display *RATE* or *TOTAL* or alternate between *BOTH* rate and total. At the *DISPLAY* prompt, press **ENTER**. The monitor shows the current display mode. To change to an alternate display mode, press **UP** or **RIGHT** to scroll to the correct display mode. Press **ENTER** to save and advance to the *RATE UNT* parameter.

Select Units of Measure

At the *RATE UNT* prompt, press **ENTER**. The monitor shows the current rate unit. If the current selection is correct, press **ENTER** to advance to the next parameter. To change to an alternate unit, press **UP** or **RIGHT** to scroll to the correct rate unit. Press **ENTER** to save and advance to the *RATE INT* parameter.

Select Rate (Time) Interval

At the *RATE INT* prompt, press **ENTER**. The monitor shows the current time interval. If the current selection is correct, press **ENTER** to advance to the next parameter. To change to an alternate time interval, press **UP** or **RIGHT** to scroll to the correct time interval. Press **ENTER** to save and advance to the *TOTL UNT* parameter.

NOTE: If flow rate is the only measurement of interest, press **RIGHT** to advance to the *KFAC UNT* to complete the programming process.

Select Units of Measure

At the *TOTAL UNT* prompt, press **ENTER**. The monitor shows the current total units. If the current selection is correct, press **ENTER** to advance to the next parameter. To change to an alternate unit, press **UP** or **RIGHT** to scroll to the correct totalization unit. Press **ENTER** to save and advance to the *TOTL MUL* parameter.

NOTE: This unit of measure does not have to reflect the rate unit you have previously chosen.
Example: Rate Units = Gallons, Total Units = Barrels

Select Total's Display Multiplier

This parameter displays the accumulated flow total in multiples of 10. For example, if the optimum totalization unit is 1000 gallons, the unit total display increments by one digit for every 1000 gallons monitored. In *RUN* mode, at 1000 gallons the total monitor reads 1, at 3000 gallons, the total display reads 3. This feature eliminates having to look at a total, count the digits, and mentally insert commas for each 1000 multiple.

At the *TOTL MUL* prompt, press **ENTER**. The monitor shows the current total multiplier. If the current selection is correct, press **ENTER** to advance to the next parameter. To change to an alternate multiplier, press **UP** or **RIGHT** to scroll to the correct multiplier unit. Press **ENTER** to save and advance to the *KFAC UNT* parameter.

NOTE: If pounds or kilograms were chosen as the *RATE UNT* or *TOTL UNT*, the monitor advances to the *SP GRAV* parameter.

Specific Gravity
At the SP GRAV parameter, press **ENTER**. The first digit of the current specific gravity flashes. If the current setting is correct, press **ENTER** to advance to the next parameter. To change the current setting, press **RIGHT** to move to the correct digit. Press **UP** to increment the digit. Repeat for all digits. Press **ENTER** to save and advance to the *KFAC UNT* parameter.

Enter Meter's K-Factor Unit

NOTE: The K-factor supplied with the meter, or calculated from calibration data, is needed to complete this step.

At the *KFAC UNT* prompt, press **ENTER**. The display shows the current K-factor unit. If the current selection is correct, press **ENTER** to advance to the next parameter. To change the K-factor, press **UP** or **RIGHT** to scroll to the correct K-factor. Press **ENTER** to save and advance to the *SCALE F* parameter.

NOTE: For meters calibrated in gallons, use *PUL/GAL*; for meters calibrated in cubic meters, use *PUL/M3* or any other unit option.

Scale Factor

The scale factor is used to force a global change to all variables. For example, under operating conditions the display is reading a consistent three percent below the expected values at all flow rates. Rather than changing all parameters individually, the scale factor is used to compensate for the three percent offset. Set the scale factor to 1.03 to correct the readings. The range of scale factors is 0.5…1.5. The default scale factor is 1.0.

At the *SCALE F* prompt, press **ENTER**. The first digit of the current scale factor flashes. If the current selection is correct, press **ENTER** to advance to the next parameter. To change to an alternate scale factor, press **UP** to increment the display digit until it matches the first digit of the new scale factor. Press **RIGHT** to advance to the next digit. Repeat for all digits. Press **ENTER** to save and advance to the *METERTYP* parameter.

Meter Type

At the *METERTYP* prompt, press **ENTER**. The current meter type displays. If the current selection is correct, press **ENTER** to advance to the next parameter. To change the type, press **UP** or **RIGHT**. Press **ENTER** to save and advance to the next parameter. If *GAS* is selected, the operating pressure (psig) and operating temperature (° F) must be entered. If *LIQUID* is selected, the monitor advances to the *DAMPING* parameter.

NOTE: The 4…20 mA zero and span values are not factory set.

Operating Pressure
At the *OP PRES* prompt, press **ENTER**. The first digit of the current setting flashes. If the current setting is correct, press **ENTER** to advance to the next paramter. To change the current setting, press **RIGHT** to move to the correct digit. Press **UP** to increment the digit until it matches the new operating pressure. Repeat for all digits. Press **ENTER** to save and advance to the *OP TEMP* parameter.

Operating Temperature
At the *OP TEMP* prompt, press **ENTER**. The first digit of the current setting flashes. If the current setting is correct, press **ENTER** to advance to the next paramter. To change the current setting, press **RIGHT** to move to the correct digit. Press **UP** to increment the digit until it reaches the new operating temperature. Repeat for all digits. Press **ENTER** to save and advance to the *DAMPING* parameter.

Damping Factor

The damping factor is increased to enhance the stability of the flow readings, and decreased to allow the flow meter to react faster to changing values of flow. This parameter can be any value 0…99 with 0 being the default.

At the *DAMPING* prompt, press **ENTER**. The first digit of the current damping setting flashes. If the current selection is correct, press **ENTER** to advance to the next parameter. To change the damping factor, press **UP** to increment the digit. Press **RIGHT** to move to the next digit. After all digits are entered, press **ENTER** to save and advance to the *PULS OUT* parameter.

Totalizer Pulse Output

The pulse output parameter can be either enabled or disabled. When enabled, this output generates a 20 mS duration pulse for every time the least significant digit of the totalizer increments. The amplitude of the pulse is dependent on the voltage level of the supply connected to the pulse output and is limited to a maximum 30V DC.

Linearization

Linearization enhances the accuracy of the display. The linearization accepts a maximum of ten points and requires additional calibration data from the meter being used with the monitor. Typically, calibration information can be obtained in three, five and ten points from the flow meter's manufacturer. If linearization is not needed, press **RIGHT** to advance to the next parameter. To complete linearization, press **ENTER** at the *LINEAR* prompt. The meter advances to the *NUM PTS* parameter.

Number of Points
If the number of points is set to *0*, linearization is disabled. Press **ENTER.** The most significant digit of the number of points entry begins to flash. The first number can be a *1* or a *0* only. Press **UP** to increment the first digit. Press **RIGHT** to move to the least significant digit. When both digits have been entered, press **ENTER** to save and advance to the *FREQ 1* parameter.

Frequency
At the *FREQ 1* prompt, press **ENTER.** The first digit of the first linear point's frequency input flashes. If the first frequency is correct, press **ENTER** to advance to the next parameter. To change the frequency, press **UP** to increment the digit. Press **RIGHT** to move to the next digit. After all digits are entered, press **ENTER** to save and advance to the *COEFF 1* parameter.

Coefficient
The coefficient is the value applied to the nominal K-factor to correct it to the exact K-factor for that point. The coefficient is calculated by dividing the actual K-factor for that point by the average K-factor for the flow meter.

$$\text{Coefficient} = \frac{\text{Actual K-Factor}}{\text{Average K-Factor}}$$

At the *COEFF* prompt, press **ENTER.** The first digit of the coefficient flashes. If the first coefficient is correct, press **ENTER** to advance to the next parameter. To change the frequency, press **UP** to increment the digit. Press **RIGHT** to move to the next digit. Repeat for all digits. After all digits are entered, press **ENTER** to save and advance to the next set of linear points. Continue entering pairs of frequency and coefficient points until all data has been entered. Press **MENU** twice at the *NUM PTS* prompt to exit to the *LINEAR* prompt. Press **RIGHT** to advance to the *PASSWORD* parameter.

Password
The password setting restricts access to *PROGRAM* mode. Initially, the password is set to all zeros and any user can modify the paramter settings. To change the password, press **ENTER** at the *PASSWORD* prompt. The first digit flashes. Press **UP** to increment the digit and **RIGHT** to advance to the next digit. After entering all digits, press **ENTER** to store the password and advance to *RST PSWD*. The new password is now required to enter *PROGRAM* mode. With this password set, any user is able to reset the stored totals on the monitor.

NOTE: This password will allow the operator to manually reset totals.

Reset Password
The reset password parameter restricts resetting the totals on the monitor. The *PASSWORD* must also be set to restrict the total reset. Initially, the password is set to all zeros and any user can reset the stored totals on the monitor. To change the password, press **ENTER** at the *RST PSWD* prompt. The first digit flashes. Press **UP** to increment the digit and **RIGHT** to advance to the next digit. After entering all digits, press **ENTER** to store the password and return to the *METER* parameter. The reset pasword is now required to reset the totals on the monitor.

NOTE: Entering a password in the *PASSWORD* screen and leaving the default password in the *RST PSWD* screen allows for total resets (not requiring a password), but restricts programming modification.

Return to Run Mode

After entering all parameters, press **MENU** to return to *RUN* mode.

Run Mode

Reset Total
To reset the monitor's total display, in *RUN* mode, press **MENU** and **ENTER** simultaneously until *TOTAL RST* starts to flash. The display returns to the *RUN* mode at the conclusion of the reset procedure.

Store Total
The current total can be manually stored in the monitor's flash memory. This procedure may be needed prior to changing the settings or replacing the battery. Press and hold **ENTER** for two seconds. The display flashes *TOTALSVD* and then returns to *RUN* mode.

Automatic Store Total
The monitor is equipped with a store total feature that works automatically, saving the current total to flash memory. The frequency of saves depends on the power supply option chosen.

Battery Powered: Once per hour and just before a low battery condition turns the unit off.
Loop Powered: Once every ten minutes.

ADDITONAL SCALING PARAMETERS

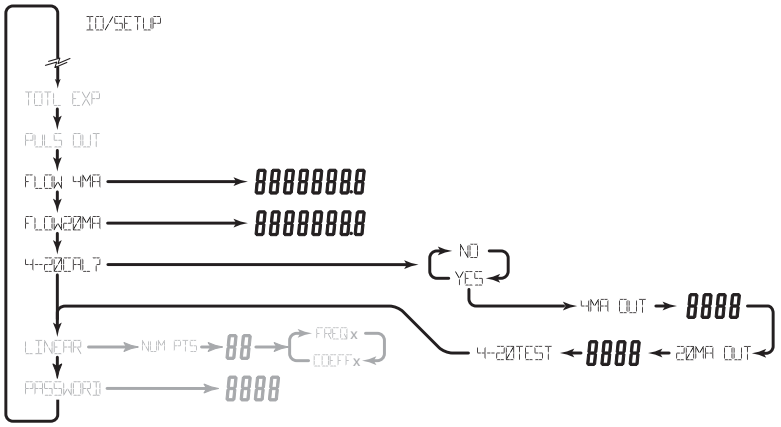


Figure 3: 4…20 mA programming menu

NOTE: The programming instructions in this section are only available for loop powered units. Battery powered units do not include these programming parameters.

Flow 4 mA Setting

Zero is the default flow rate at the 4 mA setting. If the current selection is correct, press **ENTER** to advance to the *Flow 20 mA* parameter. To change the setting, press **UP** to increment the flashing digit and press **RIGHT** to move to the next digit. Press **ENTER** to save and advance to the *Flow 20 mA* parameter.

Flow 20 mA Setting

The turbine meter's maximum flow rate is the default value for the 20 mA setting. If the current selection is correct, press **ENTER** to advance to the *4…20 mA Calibration* parameter. To change the setting, press **UP** to increment the flashing digit and press **RIGHT** to move to the next digit. Press **ENTER** to save and advance to the *4…20 mA Calibration* parameter.

4…20 mA Calibration

The *4…20 mA Calibration* parameter is the fine adjustment of the 4…20 mA output. The 4 mA setting is typically between 35…50. To set the 4 mA value, connect an ammeter in series with the loop power supply. At the *4MA OUT* prompt, press **UP** to increment and **RIGHT** to decrement the 4 mA value to until a steady 4 mA reading is reached on the ammeter. Press **ENTER** to lock in this value and advance to *20MA OUT*. The 20 mA adjustment is performed using the same procedure as the 4 mA adjustment.

4…20 mA Test

The monitor contains a diagnostic routine that allows the simulation of mA values between 4…20 to check output tracking. At the *4-20TEST* prompt press **UP** to increment the simulated mA output or **RIGHT** to decrement the value in increments of 1 mA. The ammeter should track the simulated mA output. If a 4…20 mA test in not necessary, press **ENTER** once to escape the testing at any time.

NOTE: If you ordered the B2800 flow monitor with a Blancett turbine flow meter, the 4…20 mA was programmed and factory calibrated.

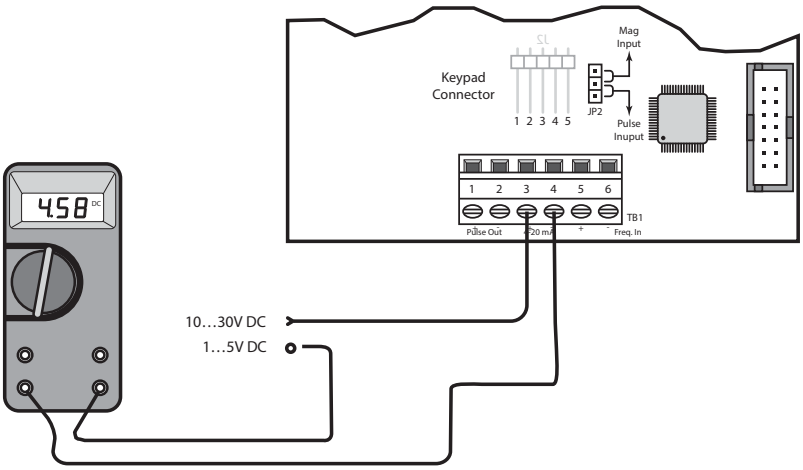


Figure 4: Typical ammeter connection

BATTERY REPLACEMENT

Battery powered monitors use a single 1.5V, D size alkaline battery. When replacement is necessary, use a clean fresh battery to ensure continued trouble-free operation. It is recommended that the total be saved to memory before the battery is removed.

1. Unscrew the two captive screws on the front panel to gain access to the battery.
2. Replace the battery, being sure to observe the proper polarity.
3. Refasten the front panel.

ADDITIONAL INPUT OPTIONS

The B2800 flow monitor is capable of receiving magnetic pickup input (small signal sine wave) or a contact closure input (pulse). Since most Blancett turbine flow meters use a magnetic pickup, the B2800 flow monitor is shipped configured for magnetic pickup input. To change to a contact closure input, remove JP2 from the top two pins and jumper them to the bottom two pins. See *Figure 6*.

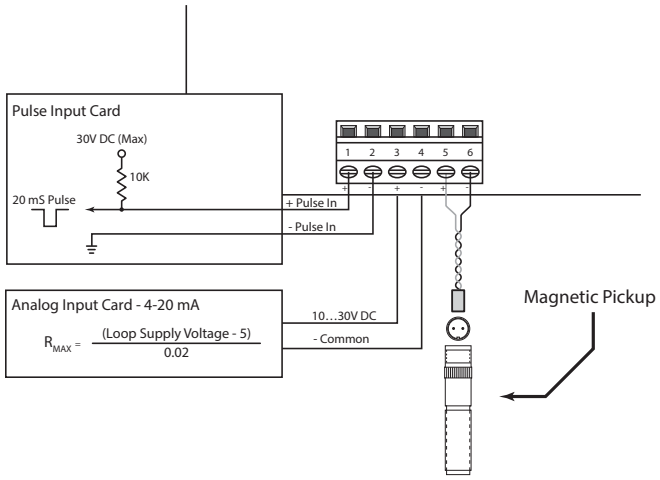


Figure 5: Wiring diagram

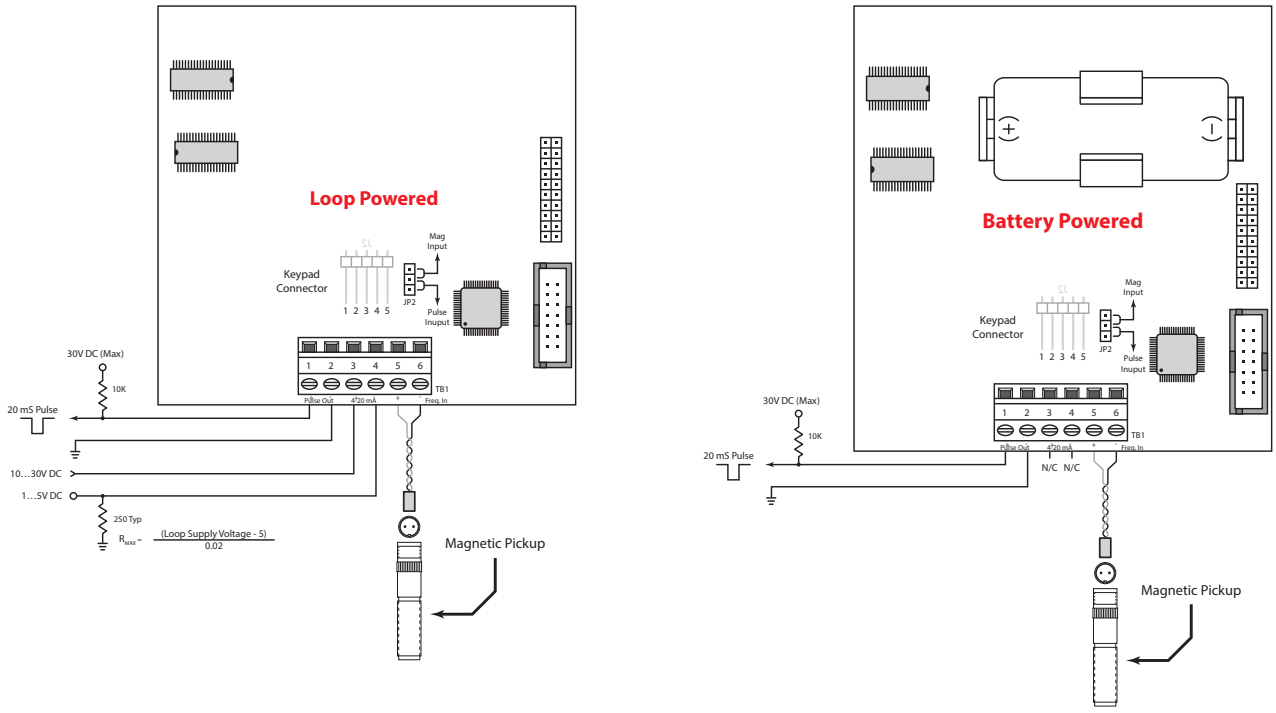


Figure 6: Circuit board layouts

ADDITIONAL SCALING INFORMATION

This information is supplied as a general introduction to the basic concepts used to scale rate displays. The applicability of the information is dependent on the type and capabilities of the specific display/monitor used.

Flow meters producing an electronic signal are normally supplied in one of two output formats. The pulse format generates some form of alternating signal that can be raw, that is no amplification or wave shaping can be done prior to transmission to the readout. The output pulse rate is related proportionally to flow rate. Pulses can also be modified to produce higher output amplitudes or specific wave shapes.

The other output format is an analog signal. This is a continuous, variable voltage or current signal that is normally scaled to the dynamic range of the meter. Typical analog signals are 0…5V DC, 0…10V DC, and 4…20 mA. The analog signals may or may not be derived from a raw pulse signal produced by the flow meter.

Scaling for any of these input signals always requires at least two scaling points for a linear process – zero or minimum flow point and the maximum flow point. Additionally, each scaling point has two components, the actual input signal value and the desired display value at that input signal for that scaling point.

For example, a pulse output flow meter has a flow of 50 gpm at a pulse rate of 100 Hz. The actual input signal is the 100 Hz figure, but allowing the display to read 100 would be meaningless to the operator. The solution to this problem is to scale the display to read 50 (gpm) when the input is 100 Hz.

Pulse Output Signals for Linear Processes

Pulse output signals are related to flow rate by a constant, usually referred to as the K-factor. The K-factor is reported as the number of accumulated pulses that represents a particular volume, such as gallon or liter. K-factors are indicated in pulses per unit volume or counts per unit volume. An example of a K-factor, normally supplied by the manufacturer, might be 2000 counts per gallon. The K-factor is correlated to flow through a simple mathematical relationship:

$$\text{Frequency} = \frac{\text{K-factor} \times \text{Volume per unit of time}}{60}$$

Using the previous example of 2000 counts per gallon and further assuming this meter has a maximum flow rate of 25 gpm, the formula can be arranged to calculate the input frequency required for a scaling point as follows:

$$\text{Frequency} = \frac{2000 \times 1\ (\text{gal})}{60} = 33.333\ \text{Hz at 1 gpm}$$

Given that the meter has a maximum flow rate of 25 gpm, the maximum frequency would then be:

$$\text{Frequency} = \frac{2000 \times 25\ (\text{gal})}{60} = 833.333\ \text{Hz at 25 gpm}$$

A programmable display requires at least two points. The first point is the zero or minimum flow and the second is normally the maximum flow rate. For the imaginary flow meter used in the example above, the scaling would be as follows:

Input Value for Scaling Point 1	=	0
Display Value for Scaling Point 1	=	0
Input Value for Scaling Point 1	=	833.33
Display Value for Scaling Point 2	=	25

Pulse Output Signals for Non-linear Processes

Few flow meters actually behave in a linear way. There is always some uncertainty about the exact flow at a given reported input value. For many common flow measurement applications, the assumption of linear flow is adequate for the process being measured. When higher accuracy is required, a technique called linearization is often employed.

When the flow meter is being calibrated, multiple data points are obtained for the particular meter being tested. A typical five point calibration run is displayed below.

GPM (LPM)	Average Frequency	**UUT Hz Counts/GAL	UUT K (Hz × 60)/NK gpm	Error (% FS)
15.00 (59.78)	769.7	3078.59	14.90	–0.65
9.06 (34.3)	466.1	3086.75	9.03	–0.38
5.49 (20.78)	285.2	3118.64	5.52	0.65
3.32 (12.57)	171.7	3103.95	3.32	0.17
2.00 (7.57)	103.6	3101.80	2.01	0.10
**UUT = Unit Under Test				

If this meter produced an actual linear output, the K-factor calculation for the Unit Under Test would be exactly the same for each measurement point. Inspection of the UUT K in the example provided shows that this is not the case and indicates that this meter is not a perfectly linear device.

Many programmable displays allow for linearization and can provide a better match of the displayed flow values with the actual flow values by incorporating more measurement points. In the example, the unit would be programmed for six points, the five data points and a zero point, and use pairs of input values to accomplish the linearization.

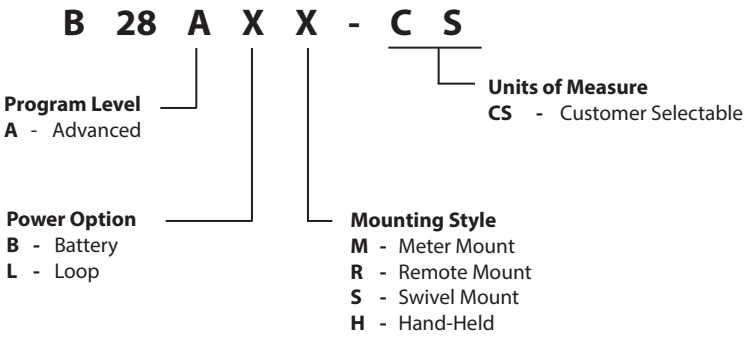
DEFAULT K-FACTOR VALUES

Meter Size	Default K-factor	Lower Limit	Upper Limit
3/8 in. (9.53 mm)	20,000	16,000	24,000
1/2 in. (12.7 mm)	13,000	10,400	15,600
3/4 in. (19.05 mm)	2750	2200	3300
7/8 in. (22.23 mm)	2686	2148	3223
1 in. (25.4 mm)	870.0	696.0	1044
1-1/2 in. (38.1 mm)	330.0	264.0	396.0
2 in. (50.8 mm)	52.0	41.6	62.0
3 in. (76.2 mm)	57.0	45.6	68.0
4 in. (101.6 mm)	29.0	23.2	35.0
6 in. (152.4 mm)	7.0	5.6	8.0
8 in. (203.2 mm)	3.0	2.4	4.0
10 in. (254 mm)	1.6	1.3	2.0

TROUBLESHOOTING GUIDE

Issue	Remedy
No LCD display	• Check battery voltage. Should be 1.5V DC. Replace if low or dead.
No rate or total displayed	• Check connection from meter pickup to display input terminals. • Check turbine meter rotor for debris. Rotor should spin freely. • Check programming of flow monitor.
Flow rate display interprets reading constantly	• This is usually an indication of external noise. Keep all AC wires separate from DC wires. • Check for large motors close to the meter pickup. • Check for radio antenna in close proximity. • Try disconnecting the pickup from the monitor pig tail. This should stop the noise.
Flow rate indicator bounces	• This usually indicates a weak signal. Replace pickup and/or check all connections. • Check K-factor.

PART NUMBER INFORMATION

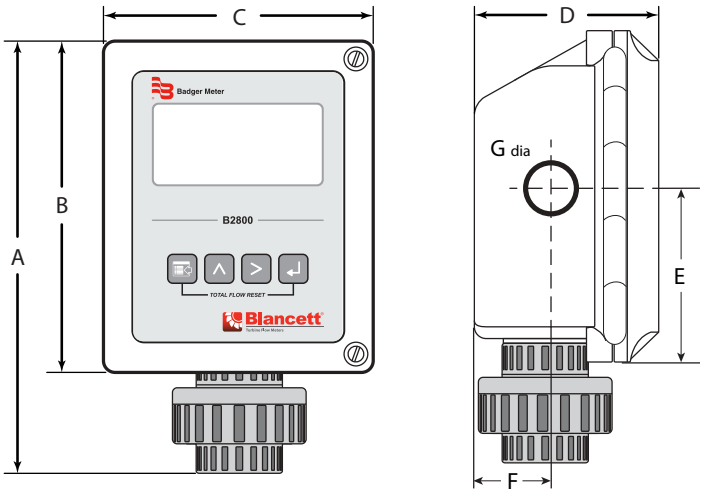


SPECIFICATIONS

Power Supply Options	Battery Powered	One D size, 1.5V alkaline battery
	Loop Powered	Optional 4…20 mA loop power
Power Consumption	Battery Powered	Less than 1 milliwatt
	Loop Powered	25 mA (maximum)
Alphanumeric Rate and Total Display	Eight digit, 0.75 in. (19.05 mm) high numeric display	
	Eight character, 0.38 in. (9.65 mm) high alphanumeric display	
	Fixed or toggle modes of operation for flow rate and totalizer display	
Pulse Output Signal	One pulse for each increment of the least significant totalizer digit	
	Pulse Type	Opto-isolated open collector transistor
	Maximum Voltage	30V DC
	Pulse Width	(ON state) 20 mS / max pulse rate 20 Hz
	Current	(ON state) 0.9V drop @ 5.0 mA or 0.7V drop @ 0.1 mA
Inputs	Frequency Range	0…3500 Hz
	Trigger Sensitivity	30 mV p-p
	Over Voltage Protected	±30V DC
Accuracy	±0.1%	
Temperature Drift	50 ppm / ° C (maximum)	
Analog Output (Loop Powered Version)	Type	4…20 mA current loop
	Resolution	1:4000
Environmental	Operating Temperature	–22…158° F (–30…70° C)
	Humidity	0…90% non-condensing
Enclosure Rating	Meter, Remote and Swivel Mount	NEMA/UL/CSA Type 4X (IP-66)
Transient Over-Voltages	Category 3, in accordance with IEC664	
Pollution Degree	2, in accordance with IEC664	
Certifications	CSA	Class I, Div 1 Groups C, D; Class II, Div 1 Groups E, F, G; CSA C22.2 No.157-92, UL 913
	CE	IEC 61326-1
Units of Measure	US Gallons, oil barrels, liters, cubic meters, MGal, cubic ft, mliters, mcf, mmcf, acre ft, liq barrels, lbs, kgs	
	Time Intervals	Day, hour minute, second

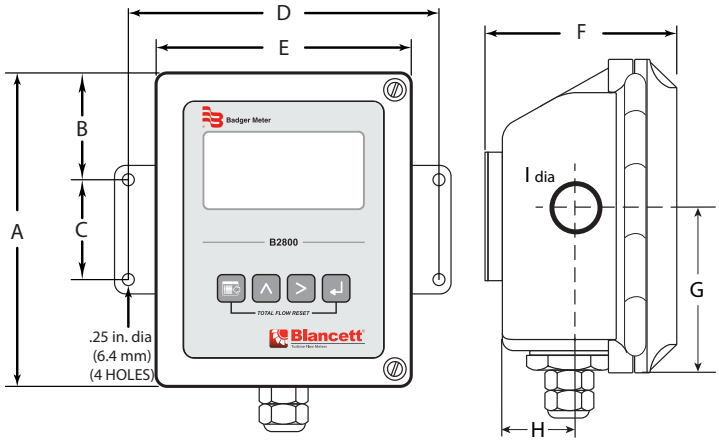
MOUNTING OPTIONS AND DIMENSIONS

Meter Mount



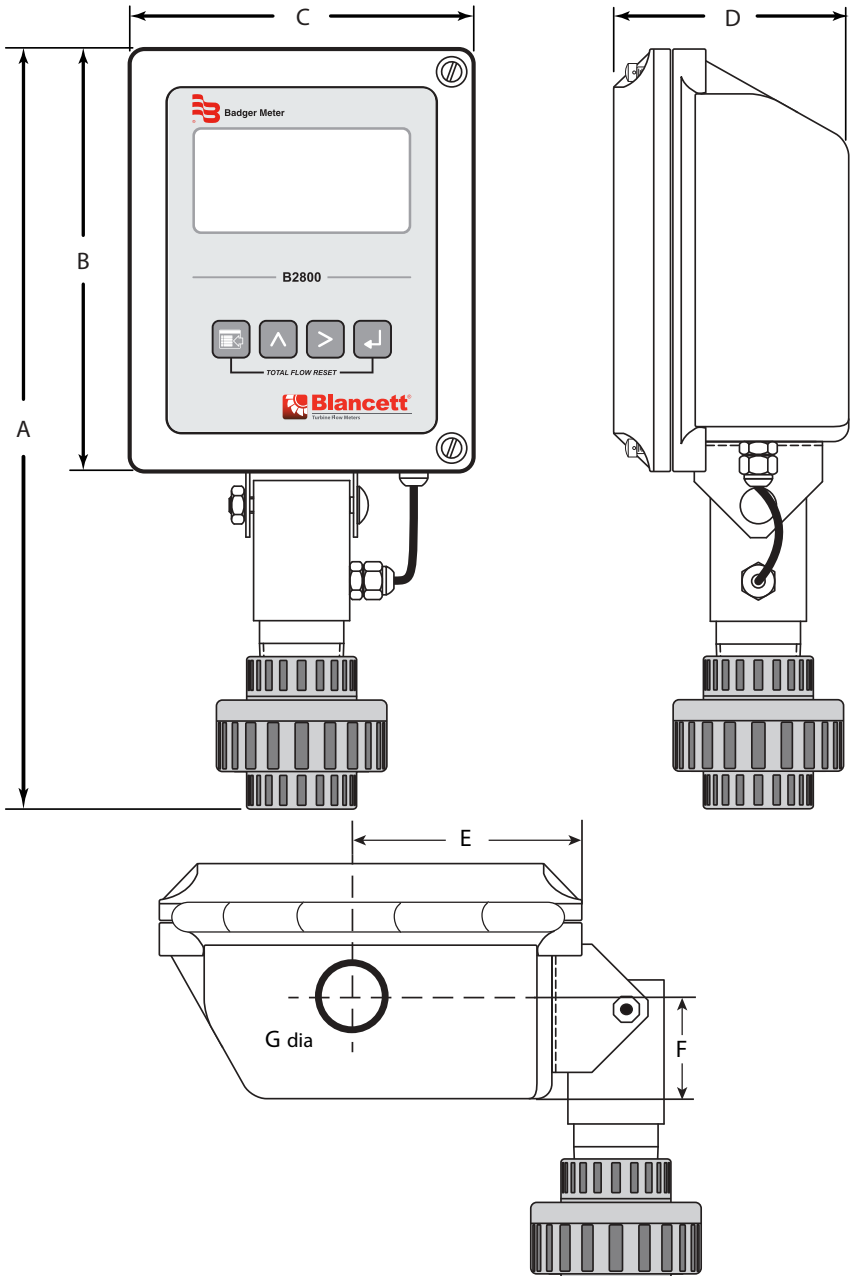
A	B	C	D	E	F	G dia
9.25 in. (235.0 mm)	7.00 in. (177.8 mm)	5.75 in. (146.0 mm)	4.00 in. (101.6 mm)	3.45 in. (87.6 mm)	1.50 in. (38.1 mm)	0.875 in. (22.2 mm)

Remote Mount



A	B	C	D	E	F	G	H	I dia
7.00 in. (177.8 mm)	2.40 in. (61.0 mm)	2.25 in. (57.2 mm)	7.00 in. (177.8 mm)	5.75 in. (146.0 mm)	4.38 in. (111.2 mm))	3.45 in. (87.6 mm)	1.50 in. (38.1 mm)	0.875 in. (22.2 mm)

Swivel Mount

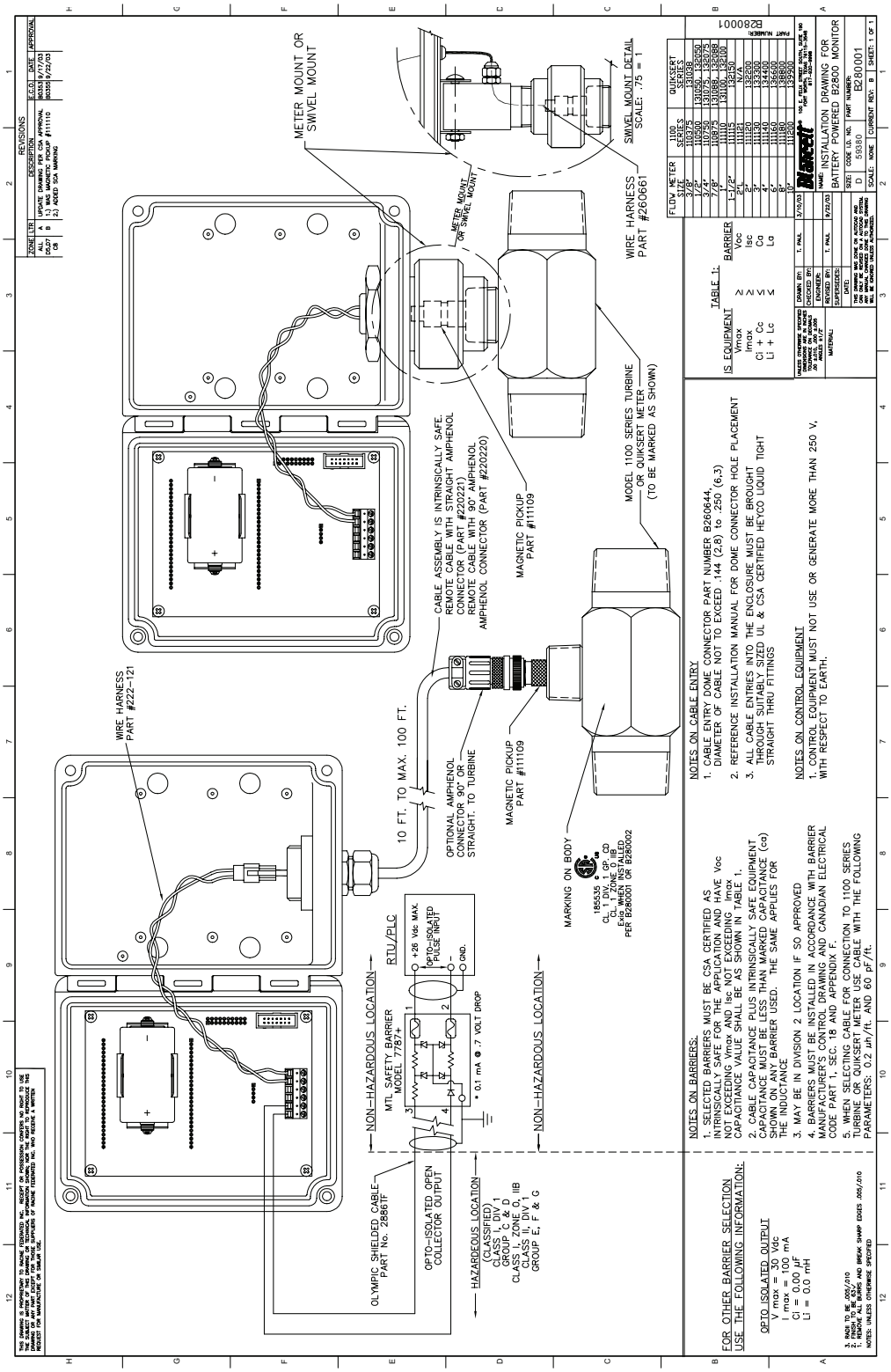


A	B	C	D	E	F	G dia
12.25 in. (311.2 mm)	7.00 in. (177.8 mm)	5.75 in. (146.0 mm)	4.00 in. (101.6 mm)	3.45 in. (87.6 mm)	1.50 in. (38.1 mm)	0.875 in. (22.2 mm)

REPLACEMENT PARTS

Component	Part Number
Keypad	B260713
Battery	B280601
Battery Tie Wrap	B228036
Pickup Cable	B222-121
Desiccant Bag	B260630
PVC Union	B220016
PVC Reducer Bushing	B220056
Rubber Washer	B228207
Steel Lock Washer	B220018
PCB Shield (battery units)	B280603
Desiccant Shield	B280680
Cord Grip	B220103

INSTALLATION DRAWING


METER MOUNT OR SWIVEL MOUNT
SWIVEL MOUNT DETAIL SCALE: .75 = 1
WIRE HARNESS PART #260661
MODEL 1100 SERIES TURBINE OR QUIKSERT METER (TO BE MARKED AS SHOWN)
MAGNETIC PICKUP PART #11109
CABLE ASSEMBLY IS INTRINSICALLY SAFE. REMOTE CABLE WITH STRAIGHT AMPHENOL CONNECTOR (PART #220221) REMOTE CABLE WITH 90° AMPHENOL AMPHENOL CONNECTOR (PART #220220)
WIRE HARNESS PART #222-121
10 FT. TO MAX. 100 FT.
OPTIONAL AMPHENOL CONNECTOR 90° OR STRAIGHT. TO TURBINE
MARKING ON BODY
185535 ⊕ GP CO CL I DIV 1 GP CD CL I ZONE 0 IIB FM APPROVED PER B280001 OR B280002
NON-HAZARDOUS LOCATION
RTU/PLC
MTL SAFETY BARRIER MODEL 7787+
+28 Vdc MAX. OPTO-ISOLATED PULSE INPUT
GND.
• 0.1 mA @ .7 VOLT DROP
OLYMPIC SHIELDED CABLE PART No. 2866TF
OPTO-ISOLATED OPEN COLLECTOR OUTPUT
HAZARDEOUS LOCATION (CLASSIFIED) CLASS I, DIV 1 GROUP C & D CLASS I, ZONE 0, IIB CLASS II, DIV 1 GROUP E, F & G
NOTES ON BARRIERS:
1. SELECTED BARRIERS MUST BE CSA CERTIFIED AS INTRINSICALLY SAFE FOR THE APPLICATION AND HAVE Voc NOT EXCEEDING Vmax AND Isc NOT EXCEEDING Imax CAPACITANCE VALUE SHALL BE AS SHOWN IN TABLE 1.
2. CABLE CAPACITANCE PLUS INTRINSICALLY SAFE EQUIPMENT CAPACITANCE MUST BE LESS THAN MARKED CAPACITANCE (ca) SHOWN ON ANY BARRIER USED. THE SAME APPLIES FOR THE INDUCTANCE
3. MAY BE IN DIVISION 2 LOCATION IF SO APPROVED
4. BARRIERS MUST BE INSTALLED IN ACCORDANCE WITH BARRIER MANUFACTURER'S CONTROL DRAWING AND CANADIAN ELECTRICAL CODE PART 1, SEC. 18 AND APPENDIX F.
5. WHEN SELECTING CABLE FOR CONNECTION TO 1100 SERIES TURBINE OR QUIKSERT METER USE CABLE WITH THE FOLLOWING PARAMETERS: 0.2 µH/Ft. AND 60 pF/Ft.
NOTES ON CABLE ENTRY
1. CABLE ENTRY DOME CONNECTOR PART NUMBER B260644, DIAMETER OF CABLE NOT TO EXCEED .144 (2.8) to .250 (6.3)
2. REFERENCE INSTALLATION MANUAL FOR DOME CONNECTOR HOLE PLACEMENT
3. ALL CABLE ENTRIES INTO THE ENCLOSURE MUST BE BROUGHT THROUGH SUITABLY SIZED UL & CSA CERTIFIED HEYCO LIQUID TIGHT STRAIGHT THRU FITTINGS
NOTES ON CONTROL EQUIPMENT
1. CONTROL EQUIPMENT MUST NOT USE OR GENERATE MORE THAN 250 V, WITH RESPECT TO EARTH.
FOR OTHER BARRIER SELECTION USE THE FOLLOWING INFORMATION:
OPTO ISOLATED OUTPUT
V max = 30 Vdc
I max = 100 mA
Ci = 0.00 µF
Li = 0.0 mH
TABLE 1:
IS EQUIPMENT ≥ BARRIER
Vmax ≥ Voc
Imax ≥ Isc
Ci + Cc ≤ Ca
Li + Lc ≤ La
FLOW METER SIZE
3/8" 110375
1/2" 110500
3/4" 110750
1" 110775
1-1/2" 111110
2" 111125
3" 111150
4" 111160
6" 111180
8" 111200
10" 111250
QUIKSERT SERIES
131038
131050 132050
131075 132075
131088 132088
131100 132100
N/A 132150
1382200
1382300
1384400
1385600
1386800
1388010
PART NUMBER: B280001
THIS DRAWING IS PROPRIETARY TO MACHINE TECHNOLOGY INC. ACCEPT OR POSSESSION CONVEYS NO RIGHT TO USE THE DRAWING OR ANY PART EXCEPT FOR THOSE PURPOSES AUTHORIZED IN WRITING BY MACHINE TECHNOLOGY INC. AND NO REPRODUCTION OR IMPLICATION OF MACHINE TECHNOLOGY INC. WHO RECEIVE A WRITTEN
REVISIONS
ZONE LTR DESCRIPTION ECO # DATE APPROVAL
A 1) WAS MAGNETIC PICKUP #111110 80355 9/22/03
B 2) ADDED SCA MARKING
DRAWN BY: T. PAUL 3/19/03
CHECKED BY:
ENGINEER: T. PAUL 9/22/03
SUPERSEDES:
DATED:
MATERIAL:
THIS VALVE ASSEMBLY IS TO BE GROUNDED IN ACCORDANCE WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE. ALL OF ASSEMBLY MUST BE GROUNDED.
Barrett 100 E. Polk Street, Suite 100 Plant City, FL 33563-4908 (813) 305-9448
NAME: INSTALLATION DRAWING FOR BATTERY POWERED B2800 MONITOR
SIZE: D CODE I.D. NO.: 59380 PART NUMBER: B280001
SCALE: NONE CURRENT REV: B SHEET: 1 OF 1
UNLESS OTHERWISE SPECIFIED: 1. REMOVE ALL BURRS AND BREAK SHARP EDGES .005/.010 2. FINISH TO BE 125 RMS 3. PAINT TO BE .005/.010

Control. Manage. Optimize.

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